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## EUROPEAN PATENT APPLICATION

⑬ Application number: 89306207.5

⑮ Int. Cl. 4: B65D 43/06

⑭ Date of filing: 20.06.89

⑯ Priority: 24.06.88 US 211311

⑰ Date of publication of application:  
27.12.89 Bulletin 89/52

⑲ Designated Contracting States:  
BE DE ES FR GB IT NL

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㉓ A covered container.

㉔ There is disclosed a covered container comprising a container body (14) and a lid (12). The container body (14) has a bottom (16) and four sidewalls (18, 20, 22, 24), the upper portion of each sidewall (18, 20, 22, 24) terminating in a sealing rim (28) having an outer sealing corner (32), an inner sealing corner (30) and a shelf (26) below the inner sealing corner (30). The container has a flexible lid (12) having a circumferential sealing ridge (40) comprising a downwardly sloping outer ridge (44) and a downwardly sloping inner ridge wall (46) and a circumferential trough (48) adjacent the sealing ridge (40). When the container is closed, a primary container seal is formed between one sealing corner of each wall and its corresponding ridge wall in the lid. The circumferential trough (48) and shelf (26) forms a secondary seal within the container located below the primary seal and is particularly effective in inhibiting moisture that condenses on the lid from migrating to the primary seal.

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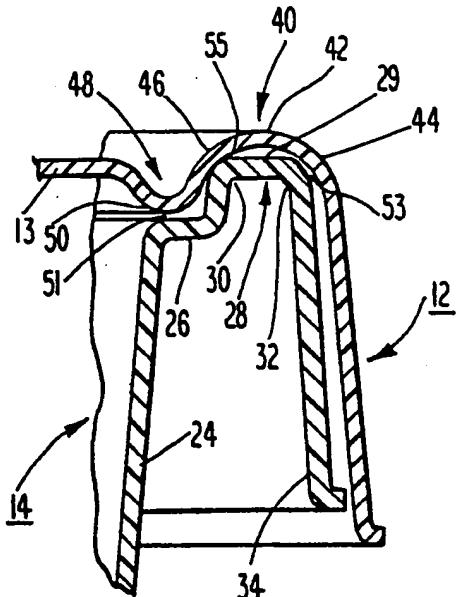


Fig. 5

## A COVERED CONTAINER

This invention relates to a covered container for packaging articles. More particularly, this invention relates to a container having a flexible lid with multiple surfaces capable of sealingly engaging surfaces of the container body.

The prior art discloses the use of containers with flexible lids that form a plug or cork-type seal between the lid and the container body. Representative prior art patents that relate to the closure and sealing of containers are discussed below:

U.S. Patent 2,489,525-Crane discloses a plastic case wherein the case body includes a shoulder 17 that forms a powder-tight seal with a closed lid 12.

U.S. Patent 3,609,263-Clementi discloses a resilient plastic container body 14 and lid 12 wherein the container body 14 has a circumferential, inverted U-shaped rim 20, 22, 24 and the lid 12 has an inverted U-shaped ridge 42, 44, 46 and a circumferential trough 38.

U.S. Patent 3,610,306-Summers discloses a lid for a container wherein the lid has a circumferential trough formed by lid elements 31, 29, 32.

U.S. Patent 4,466,552-Butterworth, et al. discloses a cover for a sterilization tray wherein the cover has a land 30 extending about the entire periphery of the cover. As shown in Fig. 2, this land area 30 appears to rest on the upper edges of ribs 46 formed in the container sidewall 43. U.S. Patent 4,570,818-Borst, et al. also discloses a package in which the lid has a trough extending about a part of the lid periphery. As best shown in Fig. 3, the trough associated with the front wall 25 of the lid rests on a shelf 10 of the front end wall 7 of the container bottom. U.S. Patent 4,027,778-Tupper discloses a lid for a container that has a moat or channel about its periphery. If the container is used to package moisture containing products such as lotion impregnated wipers, subjecting the package to a varying temperature cycle can cause moisture to condense on the underside of the lid.

It is one object of this invention to provide a lid construction in which moisture that condenses on the inner surface of the lid of the container tends to flow to an area of that surface which is lower than the primary sealing surface between the lid and container body.

Another object of this invention is to provide a secondary seal inside the container body the secondary seal being located on the sidewall of the container body below the primary seal of the container and being effective to retard moisture that condenses on the lid from reaching the primary seal of the container.

In accordance with this invention there is pro-

vided a covered container comprising a container body and a flexible lid. The container body has a bottom and four sidewalls, the upper portion of each sidewall terminating in a sealing rim having an outer sealing corner, an inner sealing corner and a shelf below the inner sealing corner. The flexible lid has a circumferential sealing ridge comprising a crown, a downwardly sloping outer ridge wall and a downwardly sloping inner ridge wall. The lid also has a circumferential trough adjacent to the inner ridge wall.

When the lid is in a sealing relationship with the container body, at least one of the two sealing corners of the sealing rim of each wall is in contact with its corresponding ridge wall in the lid to provide a primary seal between the lid and the container body. In addition, sealing is provided between any sealing corner of the rim that is in close proximity to its corresponding ridge wall in the lid. The trough in the lid overlies the shelf in the sidewalls of the container body and is either in contact with or in close proximity to the shelf thereby forming a secondary seal within the container body that is below the primary seal between the lid and the container body. This secondary seal within the container body presents a barrier to any moisture that may condense on the ceiling of the lid and which may tend to flow toward the primary container seal.

While the specification concludes with claims particularly pointing out and distinctly claiming that which is regarded as the present invention, the objects and advantages of this invention can be more readily ascertained from the following description of a preferred embodiment when read in conjunction with the accompanying drawings in which:

Fig. 1 is a front elevational view of the sealed container of this invention;

Fig. 2 is a right side elevational view of the container shown in Fig. 1;

Fig. 3 is a top plan view of the container;

Fig. 4 is a bottom plan view of the container;

Fig. 5 is an enlarged partial cross-sectional view taken along the lines 5-5 of Fig. 3;

Fig. 6 is an enlarged partial cross-sectional view taken along the lines 6-6 of Fig. 3; and

Fig. 7 is an enlarged partial cross-sectional view taken along the lines 7-7 of Fig. 3.

Figs. 1-4 show a covered container 10 that is the subject of this invention. The container 10 includes a lid 12 and a container body 14. The lid 12 is made out of thermoformed high density polyethylene and has a thickness of 0.020 inches

(0.5/mm) and the container body 14 is made out of thermoformed high density polyethylene and has a thickness of 0.030 inches (0.76 mm). The container body 14 has a front wall 18, rear wall 20, bottom 16 and sidewalls 22, 24.

The construction of the lid 12 and the upper portion of the container body 14 to accomplish sealing of the container 10 is illustrated in Figs. 5-7. Referring now to Fig. 5, the upward sloping sidewall 24 first bends outwardly to form a narrow shelf 26 and then bends up, then horizontal, then down to form an inverted U-shaped sealing rim 28. The bends in sealing rim 28 define an inner sealing corner 30, a rim top 29, an outer sealing corner 32 and a skirt 34 extending down from the outer sealing corner 32. The periphery of the lid 12 has a sealing ridge 40 formed by a crown 42, an outer ridge wall 44 extending down from the crown 42 and an inner ridge wall 46 extending down from the crown 42. The lid 12 has a trough 48 adjacent the sealing ridge 40. The bottom 50 of trough 48 overlies the shelf 26 of sidewall 24.

In one preferred embodiment, the container lid 12 is hinged to the container body 14 as shown in Fig. 7 and the lid 12 is maintained in a closed position by means of a latch as illustrated in Fig. 6. Referring now to Fig. 7, skirt 34 extending down from the outer sealing corner 32 formed at the rear wall 20 of container body 14 terminates in a living hinge 62 and horizontal hinge extension 64. Similarly, the downward sloping outer ridge wall 44 of a corresponding side of lid 12 terminates in a horizontal extension 60 which is attached, for example, by sonic welding to the hinge extension 64. A preferred embodiment of the sealing rim 28 along the rear wall 20 of the container body 14 is also shown in Fig. 7. The rim top 29, instead of being horizontal as shown in Fig. 5, slopes slightly downward from the outer sealing corner 32 to the inner sealing corner 30. This eliminates or reduces any interference between the bottom 50 of trough 48 with the inner corner 30 of the sealing rim 28 when opening and closing the container 10. In this embodiment, the outer wall 44 of sealing ridge 40 and the outer corner 32 of sealing rim 28 of the container body 14 forms the primary seal 53a between the lid 12 and the container body 14; and the close proximity of the inner ridge wall 46 to the inner corner 30 of sealing rim 28 forms a gap 55a that is about 0.012 inches (0.30 mm) which acts as a secondary seal between the lid 12 and the container body 14.

Although any latch construction for maintaining the lid 12 in a closed position can be employed, one preferred latching means is illustrated in Fig. 6. On the container body 14, the rim top 29 extends beyond the skirt 34 and then curves downward and back into the skirt 34 to form container body latch

element 54. On the container lid 12, the crown 42 of sealing ridge 40 extends out beyond the container body latch element 54 before turning downward to form the upper position of outer ridge wall 44. As outer ridge wall 44 approaches the lower part of container body latch element 54, it bends in toward the container body front wall 18, then bends downward and then back into the outer ridge wall 44 to form lid latch element 58.

For the purpose of explaining the sealing characteristics of the lid 14 with the container body 12, attention is directed to an embodiment in which the sealing rim 28 and shelf 26 of container body 14 and the sealing ridge 40 and trough 48 of lid 12 are all continuous about the entire periphery of the container 10. As shown in Fig. 5, when the lid 12 is closed and latched, a plug or cork-type seal is formed between inner sealing corner 30 of the container body 14 and the inner wall 46 of sealing ridge 40 of the lid 12. The outer sealing corner 32 of the container body 14 is in close proximity the outer wall 44 of the sealing ridge 42 of lid 12 and the bottom 50 of trough 48 is in close proximity to the top of shelf 26. By close proximity, is meant that the gaps can have a spacing between zero and about 0.015 inches (0.38 mm). In a preferred embodiment, gap 51 is about 0.010 inches (0.25 mm) and gap 53 is about 0.005 inches (0.13 mm). Because the lid 12 is somewhat flexible and does not maintain its precise shape as designed, in reality the gaps 51 and 53 will either be very close together or in some places may even touch, but providing in either case a secondary seal.

Although the cooperation of trough 48 with shelf 26 provides a secondary seal, its primary function is to make it more difficult for moisture that might condense on the ceiling 13 of the lid 12 from flowing to the primary seal 55. It will be appreciated that if trough 48 and shelf 26 were not present and horizontal ceiling 13 merely intersected inner ridge wall 46 just below the primary seal 55, any moisture which might condense on the ceiling 13 and form a liquid drop that flows to the periphery of the lid 12 would tend to collect just adjacent to the primary seal 55 and possibly leak out of the container 10 when it is closed or, when it is opened, to escape along the skirt 34 or the outer ridge wall 44. By locating a trough 48 adjacent the seal 55 such that the bottom 50 of the trough 48 is below the seal 55, moisture that may condense on the lid ceiling 13 and form a liquid drop that flows toward the periphery of the lid 12 will tend to collect at the bottom 50 of the trough 48. Once at that point, the liquid drop would have to flow uphill along the bottom of the inner wall 46 of sealing ridge 40 to reach the seal 55. The placement of shelf 26 further prevents condensation from reaching seal 55 firstly because its close proximity to the

bottom 50 of trough 48 forms a secondary seal which helps prevent any moisture from passing through narrow or closed gap 51, and secondly by providing a shelf 24 below the seal 55 upon which moisture that passes through the gap 51 can collect.

While the present invention has been described with reference to a specific embodiment thereof, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention in its broader aspects.

### Claims

1. A covered container characterised by comprising:

(a) a container body (14) having a bottom (16) and four sidewalls (18,20,22,24), the upper portion of each sidewall (18,20,22,24) terminating in a sealing rim (28) having an outer sealing corner (32), an inner sealing corner (30) and a shelf (26) below the inner sealing corner (30); and

(b) a flexible lid (12) having a circumferential sealing ridge (40) comprising a downwardly sloping outer ridge wall (44) proximate to the outer sealing corner (32), and a downwardly sloping inner ridge wall (46) proximate to the inner sealing corner (30), said lid (12) also having a circumferential trough (48) overlying and in close proximity to the shelf (26).

2. A container as claimed in claim 1, characterised in that the sealing rim (28) is continuous about the circumference of the container body (14).

3. A container as claimed in claim 1 or 2, characterised in that the shelf (26) is continuous about the circumference of the container body (14).

4. A container as claimed in claim 1, 2 or 3, characterised in that the sealing ridge (40) is continuous about the circumference of the lid (12).

5. A container as claimed in any one of the preceding claims, characterised in that the trough (48) is continuous about the circumference of the container lid (12).

6. A container as claimed in any one of the preceding claims, characterised in that at least one wall of the container further comprises a skirt (34) sloping down from the outer sealing corner (32), the container further comprising a hinge (62) connecting one lid outer ridge wall (44) to the one container wall skirt (34).

7. A covered container characterised by comprising:

(a) a container body (14) having a bottom (16) and four sidewalls (18,20,22,24), the upper portion of each sidewall (18,20,22,24) terminating in

5 a sealing rim (28) having an outer sealing corner (32), an inner sealing corner (30) and a shelf (26) below the inner sealing corner (30);

10 (b) a flexible lid (12) having a circumferential sealing ridge (40) comprising a downwardly sloping outer ridge wall (44) and a downwardly sloping inner ridge wall (46), said lid (12) also having a circumferential trough (48) adjacent to the inner ridge wall (46);

15 (c) a hinge (62) connecting the lid (12) to the container body (14); and

20 (d) means (54,58) for latching the lid (12) in a closed position over the container so that one sealing corner of each sidewall contacts its corresponding ridge wall of the lid to provide a primary seal for the container and whereas the circumferential trough (48) is in close proximity to the shelf (26).

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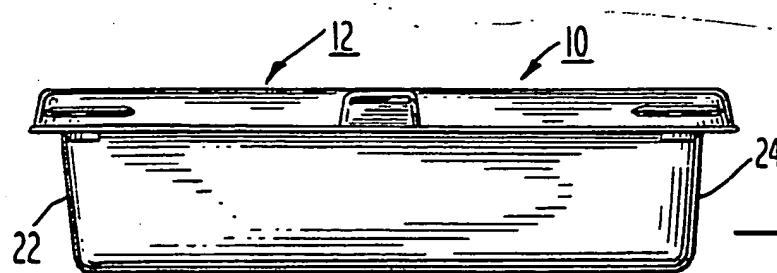
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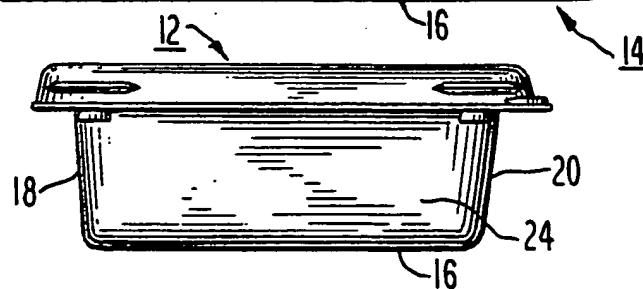
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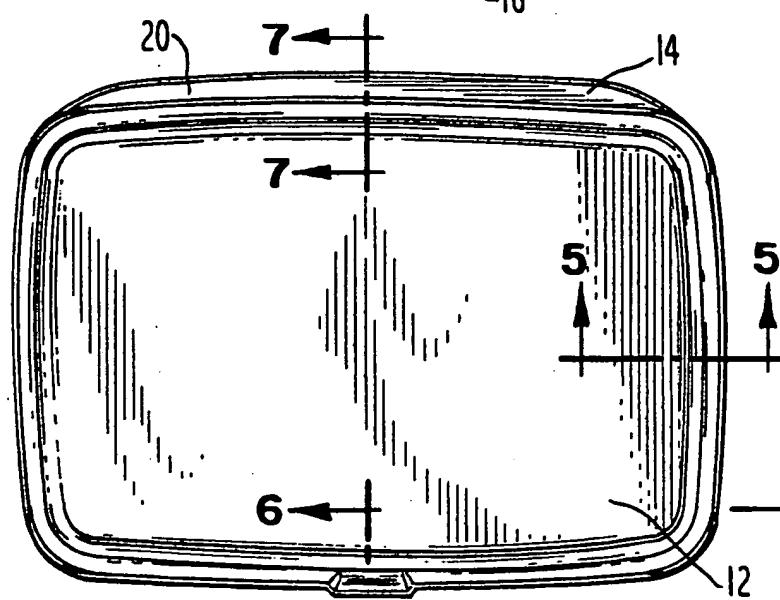
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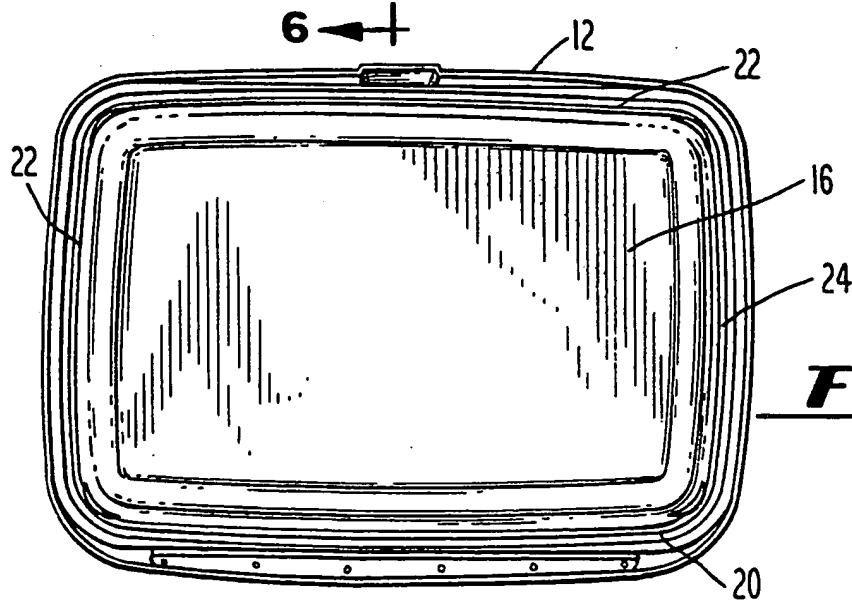
***Fig. 1***



***Fig. 2***

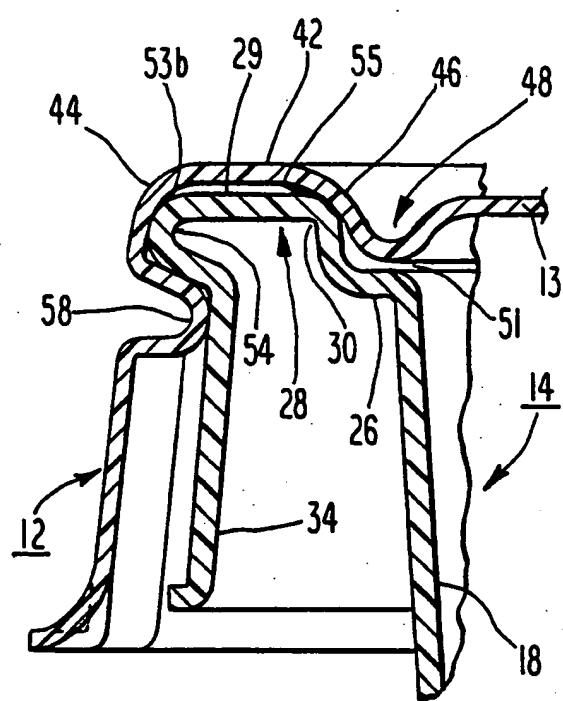
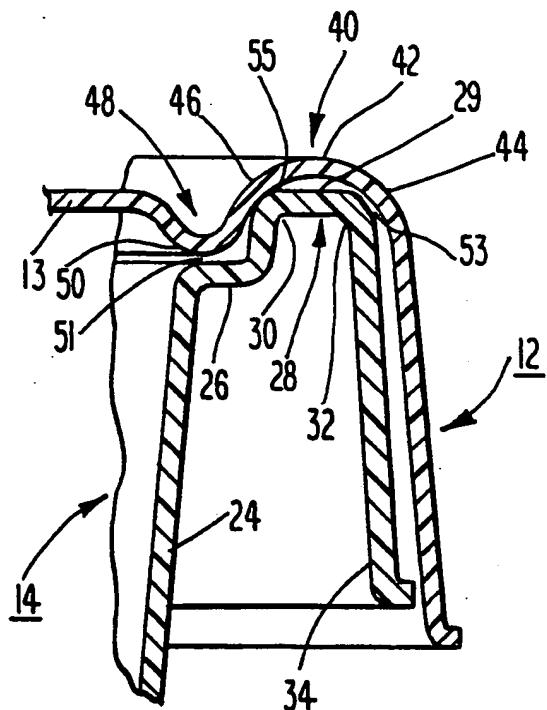


***Fig. 3***



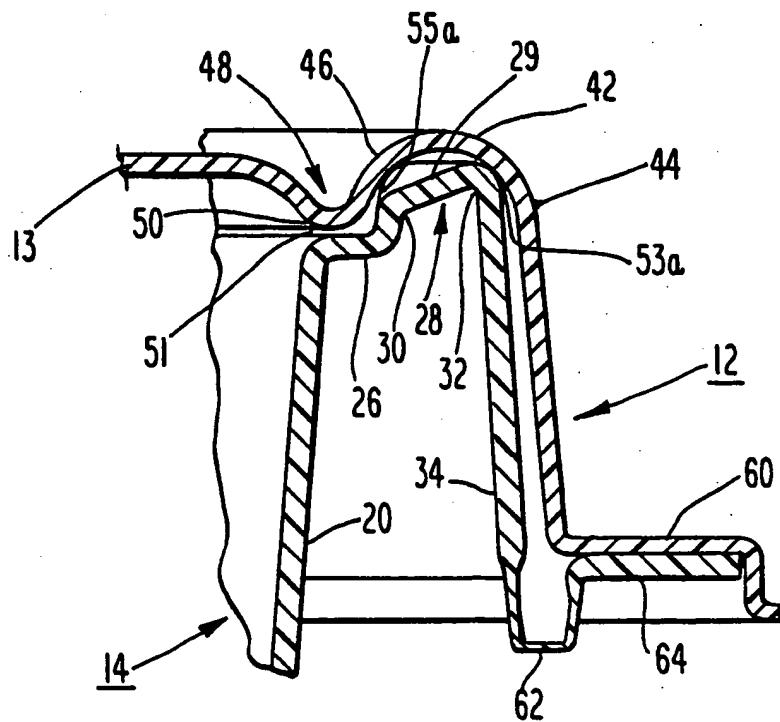
***Fig. 4***

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**Fig. 5**

**Fig. 6**



**Fig. 7**

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